| **Permittee:** |  | **Inventory No.:** |  |
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| **Reviewer:** |  | **LTF:** |  |
| **Today's Date** |  | **Checked By** |  |

| **Checklist instructions** |
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| This checklist is provided as a guideline for ADEQ staff in performing technical substantive reviews and to the applicant on what information ADEQ will need to review Aquifer Protection Permit applications.  This checklist is designed to be easy to read and follow. It is intended to address the majority of applications submitted to ADEQ, but not every possible variation or situation. Please visit the [APP website](http://www.azdeq.gov/environ/water/permits/app.html) to find program specific information including applications, rules, statutes, BADCT manuals, and other guidance information.   This checklist does not supplant or supersede statutory or rule requirements and is not intended to be binding on the applicant or ADEQ staff.  ADEQ is actively seeking comments, suggestions, or improvement of this checklist via email to Maribeth Greenslade (mg3@azdeq.gov). |

| **List of Documents Reviewed** |
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| List of documents reviewed:       |
| **Amendment Description** |
|  |
| Amendment Description:       |

| **General Requirements for (WWTP, Mining, and Industrial APP) Applications and Significant amendments** |
| --- |
| Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply |
|  | A202(A)(1) - Topographic map or other appropriate map of the facility location and contiguous land area, showing the following:* Known use of adjacent properties;
* all known water well locations found within one-half mile of the facility;
* a description of well construction details and well uses, if available
 |
| Comment |       |
|  | A202(A)(2) - A facility site plan showing all property lines, structures, water wells, injection wells, dry wells and their uses, topography and the location of points of discharge (lat./long), all known borings (for numerous borings, a narrative description of the number and location of the borings is acceptable) |
| Comment |       |
|  | A202(A)(3) - The facility design plans including proposed or as-built design details and proposed or as-built configuration of basins, ponds, waste storage areas, drainage diversion features, or other engineered elements of the facility affecting discharge. When formal as-built plan submittals are not available, the applicant shall provide documentation sufficient to allow evaluation of those elements of the facility affecting discharge, following the demonstration requirements of A.R.S. § 49-243(B).  |
| Comment |        |
|  | A202(A)(4)(a) - A summary of the known past discharge activities and the proposed facility discharge activities indicating the chemical, biological, and physical characteristics of the discharge; |
| Comment |       |
|  | A202(A)(4)(b) - A summary of the known past discharge activities and the proposed facility discharge activities indicating the rate, volume, and frequency of the discharge for each facility; |
| Comment |       |
|  | A202(A)(4)(c) - A summary of the known past discharge activities and the proposed facility discharge activities indicating the location of the discharge and a map outlining the pollutant management area described in A.R.S. §49-244(1) |
| Comment |       |
|  | A202(A)(6) - Proposed points of compliance for the facility based on A.R.S. §49-244. |
| Comment |       |
|  | A202(A)(8) - A hydrogeologic study that defines the discharge impact area, as required. |
| Comment |       |
|  | A202(A)(8)(a)(i) - The hydrogeologic study shall demonstrate that the facility will not cause or contribute to a violation of an AWQS at the applicable point of compliance; or (see A202(A)(8)(a)(ii)) |
| Comment |       |
|  | A202(A)(8)(a)(ii) - If the AWQS for a pollutant is exceeded in an aquifer at the time of permit issuance, that no additional degradation of the aquifer relative to that pollutant and determined at the applicable point of compliance will occur as a result of the discharge from the proposed facilities |
| Comment |       |
|  | A202A(9) – A detailed proposal indicating the alert levels, discharge limitations, monitoring requirements, compliance schedules, and temporary cessation or plans the applicant will use to satisfy the requirements of the APP rules and statutes. |
| Comment |       |

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| **General Requirements for (WWTP, Mining, and Industrial) APP Applications and Significant amendments** |
| Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply |
| **Based on the quantity and characteristics of pollutants discharged, methods of disposal, and site conditions, the Department may require the applicant to provide the following items (R18-9-A202(A)(8)(b).** |
|  | A202(A)(8)(b)(i) - A description of the surface and subsurface geology, including a description of all borings; |
| Comment |       |
|  | A202(A)(8)(b)(ii) - The location of any perennial, intermittent, or ephemeral surface water bodies; |
| Comment |       |
|  | A202(A)(8)(b)(iii) - The characteristics of the aquifer and geologic units with limited permeability, including depth, hydraulic conductivity, and transmissivity; |
| Comment |       |
|  | A202(A)(8)(b)(iv) - The rate, volume, and direction of surface water and groundwater flow, including hydrographs, if available, and equipotential maps; |
| Comment |       |
|  | A202(A)(8)(b)(v) - The precise location or estimate of the location of the 100-year flood plain and an assessment or the 100-year flood surface flow and potential impacts on the facility; |
| Comment |       |
|  | A202(A)(8)(b)(vi) - Documentation of the existing quality of the water in the aquifers underlying the site, including, where available, the method of analysis, quality assurance, and quality control procedures associated with the documentation; |
| Comment |       |
|  | A202(A)(8)(b)(vii) - Documentation of the extent and degree of any known soil contamination at the site; |
| Comment |       |
|  | A202(A)(8)(b)(viii) - An assessment of the potential of the discharge to cause the leaching of pollutants from surface soils or vadose zone materials; |
| Comment |       |
|  | A202(A)(8)(b)(ix) - For an underground water storage facility, an assessment of the potential of the discharge to cause the leaching of pollutants from surface soils or vadose zone materials or cause the migration of contaminated groundwater; |
| Comment |       |
|  | A202(A)(8)(b)(x) - Any changes in groundwater quality expected because of the discharge; |
| Comment |       |
|  | A202(A)(8)(b)(xi) - A description of any expected changes in the elevation or flow directions of the groundwater expected to be caused by the facility; |
| Comment |       |
|  | A202(A)(8)(b)(xii) - A map of the facility’s discharge impact area; |
| Comment |       |
|  | A202(A)(8)(b)(xiii) - The criteria and methodologies used to determine the discharge impact area. |

| **Closure and Post-closure Plan/Strategy and Cost Estimates (WWTP, Mining and Industrial)**  |
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| Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply |
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|  | A202(A)(10) Closure & Post-Closure Plan or Strategy and A201(B)(5) Closure and Post-Closure Cost Estimates should be evaluated using the checklist: Closure and Post-Closure Plan/Strategy and Cost Estimate Checklist, which is available on the ADEQ website at: http://www.azdeq.gov/environ/water/permits/app.html |
| comment |       |

| **Useful References (with links if available)** |
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| * [Mining BADCT Manual](http://www.azdeq.gov/environ/water/wastewater/download/badctmanual.pdf)
* Blaney-Criddle ([explanation](http://www.azdeq.gov/environ/water/permits/download/blaney.pdf) and [spreadsheet](http://www.azdeq.gov/environ/water/permits/download/blaney.xls) ) for reuse calculations
* [A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality (September 1996)](http://www.azdeq.gov/environ/waste/sps/download/gpl_guidance.pdf)
* [Groundwater Protection Leaching Model (VOCs) in Excel](http://www.azdeq.gov/environ/waste/sps/download/gplm.xls)
* [Groundwater Protection Leaching Model (VOCs) Instructions](http://www.azdeq.gov/environ/waste/sps/download/gpli.pdf)
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| **Statutes and Rules** |
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| Statutes and Rules* [Point of Compliance](http://www.azleg.gov/FormatDocument.asp?inDoc=/ars/49/00244.htm&Title=49&DocType=ARS)
* [Aquifer Water Quality Standards](http://www.azsos.gov/public_services/Title_18/18-11.htm)
* [Aquifer Protection Permit Rules (R18-9)](http://www.azsos.gov/public_services/Title_18/18-09.pdf)
* [Remedial Action – Soil Rule](http://www.azsos.gov/public_services/Title_18/18-07.pdf) (A.A.C. R18-7)
* [Exemptions A.R.S. 49-250](http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/49/00250.htm&Title=49&DocType=ARS)
* Class exemptions ([A.A.C. R18-9-103](http://www.azsos.gov/public_services/Title_18/18-09.pdf)) and facilities to which APP doesn’t apply ([A.A.C. R18-9-102](http://www.azsos.gov/public_services/Title_18/18-09.pdf))
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| **The Hydrology Review Process** |
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|  | The review process is indicated here for use in evaluating an application for an individual APP. The process involved for the review of amendments is detailed in a separate section to follow. This process is provided for informational purposes only. It is not intended to be binding guidance for the applicant or for department staff. The requirements of the APP Program are established in Rule and Statute.Feedback to the applicant regarding application omissions or deficiencies is communicated under the licensing timeframes rules, based upon documentation transmitted to the project manager upon completion of hydrology reviews. The steps outlined below assume that adequate information exists to provide scientifically defensible decisions regarding the requirements of the draft APP. Missing or inadequate information, as well as any questions arising out of the review process, must be transmitted in a comprehensive and timely manner, to comply with the LTF requirements. As the steps in the hydrology review process are often sequential, the hydrologist may find it useful to indicate to the applicant that the later steps in the process will remain deficiencies pending the outcome of current steps. Prior to satisfaction of all deficiencies, the hydrologist must not only confirm the satisfaction of the program requirements based upon statute and rule, but must assure that enough information has been provided to complete the fact sheet and all parts of the draft permit. The final hydrology memo documents that adequate information exists to prepare the draft APP and fact sheet, and that remaining hydrology deficiencies have been satisfied to the extent that the draft permit can be issued. The final hydrology memo may contain draft permit and fact sheet information, or the hydrologist may simply insert the information into the draft permit outline provided by the project manager.**STEPS IN THE HYDROLOGY REVIEW PROCESS**The following steps are a suggested approach to allow for the completion of the hydrology review in a logical sequence. The hydrology review may not include all of these steps, and/or follow this exact sequence. Some hydrology reviews may require additional steps.**Review Submitted Documents**The hydrologist should review all documents submitted with the application. Engineering related documents should be skimmed for any information that may be relevant to the hydrology-related issues. The above checklist should be used to determine if all required information has been submitted, and the comment rows should be used to provide the location of the information for any necessary retrieval at later times. Missing and incomplete information should be communicated to the project manager for referral to the applicant as deficiencies.**Establish Complete Facilities List**Although the decision as to which facilities at the site are regulated by the APP program, and how they will be classified, is predominantly a responsibility of the project manager and engineer, without a complete and accurate facilities list, the pollutant management area can not be determined. The initial work on the project should be planned to provide an early determination of the complete, properly classified facilities list. Disagreements on the regulatory status of facilities should remain as deficiencies until those disagreements are resolved with the applicant.**Establish Pollutant Management Area**Based upon the location and layout of regulated facilities, and the location and nature of discharges from those facilities, the applicant must propose the pollutant management area (PMA), as defined in A.R.S. § 49-244(1). The PMA is defined as the limit projected on the horizontal plane of the area on which pollutants are or will be placed. If the facility contains more that one discharging activity, the PMA is described by an imaginary line circumscribing the several discharging activities. The PMA will be used to determine the number and location of points of compliance for the facilities at the site. The PMA includes horizontal space taken up by any liner, dike, or other barrier designed to contain pollutants in the facility.The definition of “pollutant” is broad, and is defined in A.R.S. § 49-201(29).**Establish Discharge Impact Area – Per A.R.S § 49-201(13) “Discharge Impact Area” means the potential areal extent of pollutant migration, as projected on the land surface, as the result of a discharge from a facility.”** A.A.C. R18-9-A202(8)(xii) requires the applicant to provide a map of the discharge impact area (DIA). A.A.C. R18-9-A202(8)(xiii) requires a description of the criteria and methodologies used to determine the DIA.The DIA provides an understanding of the extent and degree of contamination to be expected in the aquifers underlying the site, and in the vadose zone, as a result of the proposed discharge activities at the site. In this way, the conditions and requirements of the permit can be developed to protect down-gradient users. The DIA will often include a fate and transport analysis that must be evaluated by the hydrologist. The discharge must not cause or contribute to a violation of an aquifer water quality standard (AWQS) at the point of compliance, or if an AWQS is already exceeded at the time of permit issuance, the discharge may not cause additional degradation relative to that pollutant at the applicable point of compliance. **Groundwater Uses**The requirements of A.A.C. R18-9-A202(A)(1) include that the applicant submit the known use of adjacent properties, all known water well locations found within one-half mile of the facility and a description of well construction details and uses, if known. This information and information regarding the DIA, PMA and discharge characterization should be used by the hydrologist to evaluate whether any groundwater users are located nearby. These nearby users/uses of wells should also be considered during the establishment of point of compliance (POC) locations. The Department has the discretion to request an expanded well inventory search depending on the nature of the discharge and potential/known uses.**Establish Points of Compliance**The POC locations should be established in accordance with A.R.S. §49-244. For hazardous pollutants, the POC is the limit of the pollutant management area (PMA), unless the permittee can demonstrate either 1) that it is technically impracticable or inappropriate considering the likely fate or transport of a pollutant in an aquifer to monitoring at the PMA boundary or 2) the alternative POC will allow installation and operation of the monitoring facilities that are substantially less costly (see A.R.S. § 49-244(2)(a-b) for specific details). POC locations may be identified for non-hazardous pollutants at distances further down gradient than hazardous POCs, but must be located as to ensure protection of all current and reasonably foreseeable future uses of the aquifer. Occasionally, POC locations will be identified as “theoretical” or “conceptual” with no monitoring required. A.R.S. §49-244 has specific requirements for the establishment of POC locations, including specific documentation required to support the establishment of an alternative point of compliance. The ADEQ hydrologist has discretion as to the number of POC locations (density) and the exact points along the PMA for POCs. The decision will depend upon site specific conditions, including but not exclusively, the expected pollutants, the location of potential groundwater users and the use of the wells, the uses of the aquifer, the characteristics of the aquifer and the locations of the discharging facilities. **Establish Groundwater Monitoring Program**The groundwater monitoring program is usually established based upon site/facility specific discharge characterization data received from the applicant. Particular attention should be paid towards those constituents with numeric aquifer water quality standards. **Establish Criteria for Alert Level and Aquifer Quality Limit Calculations**Due to the step-wise nature of the hydrology review and approval process, it is rare for an applicant to have ambient data from the selected POC locations available for review with the initially submitted application. The ambient groundwater monitoring will typically be performed after issuance of the permit, based upon compliance schedule requirements. The alert level (AL) calculations are typically done based upon the results of a minimum of eight (8) and maximum of twelve (12) groundwater sampling rounds. The following procedures and permit language for establishing alert levels and aquifer quality limits (AQLs) have been used in the past for various mining permits:**Alert Levels for POC Wells**The AQLs and ALs are established and calculated by the following formula or another valid statistical method submitted to the Groundwater Section (GWS) in writing and approved for this permit by the GWS:AL = M + KWhere M = mean, = standard deviation, and K = one-sided normal tolerance interval with a 95% confidence level (Lieberman, G.J. (1958) Tables for One-sided Statistical Tolerance Limits: Industrial Quality Control, Vol. XIV, No. 10). Obvious outliers should be excluded from the data used in the AL calculation.The following criteria shall be met in establishing ALs in the permit:1. The AL is calculated for a parameter using the analyses from eight (8) consecutive sample rounds.
2. Any data where the PQL exceeds 80% of the AWQS is not included in the AL calculation.
3. If a parameter is below the detection limit, the permittee must report the value as “less than” the numeric value for the PQL or detection limit for the parameter, not just as “non-detect”. For those parameters, the permittee uses a value of one-half the reported detection limit for the AL calculation.
4. If the analytical results from more than 50% of the samples for a specific parameter are non-detect, then the AL is set at 80% of the AWQS.
5. If the calculated AL for a specific constituent and well is less than 80% of the AWQS, the AL is set at 80% of the AWQS for that constituent in that well.

**Aquifer Quality Limits for POC Well**For each of the monitored analytes for which a numeric AWQS has been adopted, the AQL is established as follows:1. If the calculated AL is less than the AWQS, then the AQL is set equal to the AWQS.2. If the calculated AL is greater than the AWQS, then the AQL is set equal to the calculated AL value, and no AL shall be set for that constituent at that monitoring point.The following table was taken from (Lieberman, G.J. (1958) - Tolerance Factors (K) for Tolerance Intervals Having a 95 Percent Confidence Level

|  |  |
| --- | --- |
| n | K |
| 4 | 5.145 |
| 5 | 4.202 |
| 6 | 3.707 |
| 7 | 3.399 |
| 8 | 3.188 |
| 9 | 3.031 |
| 10 | 2.911 |
| 11 | 2.815 |
| 12 | 2.736 |

Other statistical methods may be used. If other methods are utilized, a full description of the method, equation, tables and any other supporting material must be submitted with the application. The applicant may defer to ADEQ to make these calculations. If after the ambient monitoring period, concentrations for constituents are equal to or less than the AWQS, the AQLs must be set at the AWQS per A.A.C. R18-9-A205(C)(1). The limits in wastewater permits are often established at 80% of the AWQS for ALs and at the AWQS for AQLs, without ambient groundwater monitoring. If it is thought that there might be a problem meeting the AWQS for constituents, ambient monitoring would be conducted as discussed in the previous paragraph.**Draft Permit Information**The hydrology sections of the draft permit should be prepared for the project manager by the ADEQ Hydrologist. This information is either placed in the final hydrology memo and/or inserted into the draft permit outline provided by the project manager. Most sections of the permit are available in the APP framework.**Fact Sheet Information**The hydrology sections of the fact sheet should be prepared for the project manager by the ADEQ Hydrologist. This information is either placed in the final hydrology memo and/or inserted into the fact sheet outline provided by the project manager. The sections generally inserted by the hydrologist are:(1) Brief summary of hydrogeologic setting, to be included in the Facility Description (Section II)(2) Compliance With Aquifer Water Quality Standards (Section III)(3) Storm Water and Surface Water Issues (Section IV)(4) Compliance Schedule Items (Section IV) such as discharge monitoring, installation of POCs, ambient sampling, etc.**SUPPLEMENTAL CONSIDERATIONS****Passive Containment – Open Pit Mines** The use of passive containment as a component of BADCT is allowed under A.R.S.§ 49-243(G).This is allowed if the mine pit creates a passive containment that is sufficient to capture the pollutants discharged and that is hydrologically isolated to the extent that it does not allow pollutant migration from the capture zone.The statute specifies that passive containment means natural or engineered topographical, geological, or hydrological control measures that can operate without continuous maintenance. Therefore, hydrologic containment that is achieved by active pumping of solutions from the open pit does not constitute passive containment. To evaluate passive containment, the applicant must model the equilibrium condition to be attained if active pumping ceases, and the open pit returns to an equilibrium condition. This is the condition where the pit lake evaporation equals the volume of stormwater and groundwater inflow to the pit, resulting in a stabilized condition. This modeled condition can be utilized to determine the groundwater divide, within which groundwater will flow toward the open pit, creating a passive containment capture zone (PCCZ) that can be indicated on a map. The PCCZ demonstration is based on site specific conditions and may be complex because current and future planned pit configurations need to be considered. Communication between the applicant and ADEQ hydrologist during the pre-application stage and throughout the substantive review will assist in identifying specific information needed to demonstrate passive containment. **Wastewater Issues**Wastewater permits must occasionally include a separate POC location for discharges in excess of 250,000 gallons of effluent per day to surface water drainages. Wastewater permits, in coordination with AZPDES permits, routinely allow the disposal of treated effluent to surface water drainages. Effluent discharges that average less than 250,000 gallons per day, while they must meet effluent discharge limitations and the requirements of the AZPDES permit, do not require a POC for the evaluation of groundwater impacts. If a POC is required, the PMA for the surface effluent discharge is the distance that the effluent will flow in the drainage until it is all percolated into the soil. The POC is established at the downstream edge of this flow footprint.Wastewater permits may also include disposal of effluent through the use of trenches, infiltration basins, or injection wells (i.e. – recharge to the aquifer). As a part of these applications, the applicant should provide an analysis of any potential groundwater mounding that can be predicted to occur based upon the proposed discharge. Permit conditions may require the monitoring of groundwater levels to evaluate any mounding that occurs, and any resulting change in groundwater flow direction. A change in groundwater flow direction or quality due to groundwater recharge may require the establishment of new POC locations.**Reuse Issues**Reuse permits will often permit the use of treated wastewater effluent for consumptive reuse on landscaping and other plants. The related individual APP will generally include a specific effluent disposal method(s), including volume limitations. A separate reuse permit is also required in accordance with A.A.C. R18-9-700, in addition to the individual APP. The GWS has established a spreadsheet using a Blaney-Criddle approach for the evaluation of consumptive reuse on associated grasses and trees. This spreadsheet and associated instructions have been posted on the ADEQ website. Any water use beyond that consumed by the established vegetation constitutes a recharge to the aquifer, and will require an APP to regulate the recharge.**Well Design**All monitor wells should be designed to provide water analyses that are representative of the water quality in the relevant aquifer. Well design and screen locations are highly site specific, and must be proposed by the applicant and evaluated by the hydrologist. Current GWS practice is to allow screened intervals of up to 60 feet, as a compromise between obtaining acceptably representative samples and cost effectiveness. If the groundwater level has displayed significant historical fluctuation, or is anticipated to fluctuate significantly in the future, the hydrologist should evaluate a request by the applicant for a longer well screen, or some other appropriate alternative well design.**Monitoring Protocols**Monitoring protocols are defined in the current APP framework.**Significant Amendments** The Significant Amendment application should include the same information that is generally included in an individual APP application. Certain information may not be required if no changes to that information have occurred since permit issuance, and the significant amendment does not require changes to that information. The hydrologist should be alert for potential changes to the PMA, required POC locations, or monitoring programs that will be necessary based upon the changes proposed in the amendment application. Based upon any changes to the volume, location, or characteristics of the discharge, the DIA may also need to be re-evaluated.**Recharge Issues**Some Individual Aquifer Protection Permits are issued for facilities for which the Arizona Department of Water Resources (ADWR) issues Underground Storage Facility (USF) permits. These APPs involve recharge (vadose zone recharge wells, deep injection wells, or recharge basins) as an end use. ADWR USF permit provisions regulate minimum depth to water and require groundwater quality monitoring. The project hydrologist should contact ADWR to identify the following:1. Any unique issues related to the USF permit.2. The locations of any nearby USF permits.3. The proposed monitoring and AL/Operation Prohibition Limits (OPLs) for the ADWR USF permit.4. Any other common provisions between the APP and USF permits.If possible, APP monitoring provisions should be consistent with ADWR USF monitoring provisions. Draft monitoring tables should be sent to the ADWR project hydrologist for review. |
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